

Running head: DEVELOP A CARDIOVASCULAR FITNESS PROGRAM

Executive Leadership

The Need to Develop a Cardiovascular Fitness Program at the Ridge Road Fire District

William H. Rickman

Ridge Road Fire District

Rochester, NY

March 2007

Abstract

The present study explored the issue of firefighters dying from heart attacks. The problem identified was the Ridge Road Fire District (RRFD) does not address the importance of a cardiovascular physical fitness program to improve the health and safety of firefighters. The purpose was to gather the necessary information to justify the need to develop a cardiovascular fitness program for the firefighters at the RRFD. Descriptive research was used to answer the following questions:

1. Why should the Ridge Road Fire District institute a cardiovascular fitness program?
2. What medical data supports designing a cardiovascular program?
3. How do other public safety professions address cardiovascular fitness?
4. What resources would the Ridge Road Fire District need to develop a cardiovascular fitness program?

The procedure for this project included a review of relevant literature on cardiovascular accidents (heart attacks) and the importance of physical fitness. This researcher examined operations or procedures of other fire departments and public safety professions in regards to cardiovascular fitness. In addition, interviews were conducted with people who have a vast knowledge to support this applied research project (ARP). The results from the research indicated a cardiovascular fitness program may help reduce the number of firefighter deaths from heart attacks. The recommendation from this research is to make firefighters aware that heart attacks are the leading cause of death for firefighters, express the importance of a cardiovascular fitness program, and the need to provide firefighters with a fitness program and equipment to help reduce cardiac deaths among firefighters.

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Introduction

America's firefighters are faced with the arduous task of protecting our community. One of the most pressing issues emerging in the fire service is cardiovascular incidents (heart attacks). Heart attacks are the leading cause of firefighter fatalities. In 1998, the Ridge Road Fire District (RRFD) suffered a line-of-duty death (LODD) to a firefighter. The cause of the death was from a heart attack. The problem is the RRFD has not addressed the importance of a cardiovascular fitness program. Far too many firefighters are dying each year from heart attacks and the number of firefighter deaths from this disease is on the rise. The purpose of this research project is to gather the necessary information to demonstrate the need to develop a comprehensive fitness program that will help improve the overall fitness of firefighters and, in turn, the organization. In doing so, it would conclusively help reduce the number of firefighters dying from heart attacks and also save money for the fire district from medical-related expenses.

Descriptive research method was chosen to complete this project. In gathering the information for this research, the following questions were posed:

1. Why should the RRFD institute a cardiovascular fitness program?
2. What medical data supports designing a cardiovascular fitness program?
3. How do other public safety professions address cardiovascular fitness?
4. What resources would the RRFD need to develop a cardiovascular fitness program?

Background and Significance

The RRFD borders the City of Rochester on the west side in the State of New York. The district has two main thoroughfares running through the district, Route 104 and Interstate 390. The department's response area covers 16 square miles and services approximately 35,000

citizens. The district is a bedroom community with shopping malls, plazas, schools, daycare facilities, industry, nursing homes, and a hospital.

The RRFD was established in 1922 as a volunteer department. In 1959, the first career firefighter was hired. Today, RRFD is a fully paid department consisting of 53 uniformed firefighters both men and women; 48 are assigned line functions while the remaining are assigned to staff positions. The staff positions consist of the chief, deputy chief, a captain, and lieutenant who is in charge of fire and emergency medical services (EMS) training. An additional battalion chief and 3 civilian part-time personnel work in the fire education department. The RRFD also has a civilian office administrator, chaplain, a part-time secretary, and treasurer.

The department works a four group system. Each group currently consists of a battalion chief, captain, lieutenant, 7 firefighters, 1 emergency medical technician (EMT), and 1 public safety dispatcher (PSD). The group works a 42-hour work schedule consisting of working (2) 10-hour days (7:00 a.m. until 5:00 p.m.), 24 hours off then (2) 14-hour nights (5:00 p.m. until 7:00 a.m.) followed by 4 days off. Minimum staffing, including the PSD, is 8. In the calendar year 2006, the RRFD answered 6,987 emergency calls responding out of 2 fire stations. In addition to responding to emergency calls for fire and EMS, the RRFD provides public education to all age groups, commercial business inspections, child car seat inspection and installations, tours of the fire stations, technical rescue, haz-mat, and water rescue.

According to the U.S. Fire Administration (USFA) (2005), it was estimated in 2004 there were 1,100,750 career and volunteer firefighters (p. 1). Firefighting remains a stressful and dangerous job. As a firefighter, you can go from a relaxed atmosphere to a stressful environment

in a matter of seconds. As Fielding (2005) found from the U.S. Labor Department statistics, a firefighter is the 14th most dangerous job in America (p. 2).

The USFA (2002) study on firefighter fatalities between 1990 and the year 2000, reflected heart attacks as the number one killer of firefighters. Nearly 44% of firefighter deaths were due to heart attacks (p. 1). In addition, the USFA (2002) goes on to say firefighters, as a group, are more likely than other American workers to die of a heart attack while on duty (p. 25).

According to the Center for Disease Control (CDC) (2006), heart disease and stroke are the most common cardiovascular diseases (p. 3). They are the first and third leading causes of death for men and women in the United States, accounting for nearly 40% of all annual deaths. As far as this researcher can determine, since the inception of RRFD, the department has experienced only one line-of-duty death from a heart attack. Firefighters expend a great deal of intense sudden energy when the alarm sounds. If a firefighter is out of shape or has an existing cardiac condition, this sudden energy burst could lead to a fatal heart attack.

According to the USFA (2002) they wanted to reduce the number of firefighter fatalities 25% by the year 2005 (p. 1). The National Fire Protection Agency (NFPA) (2000) issued its standard in 2000 in NFPA 1583: Standard on Health-Related Fitness Programs for Firefighters. The standard requires fire departments to establish programs to safely meet the excessive physical demands of the fire service and help develop and maintain a healthy work force.

During the 1970's, hydraulic exercise equipment was purchased at RRFD. The goal at that time was for firefighters to build strength to do their job. In 1988, RRFD established between the hours of 08:00 and 09:00 a.m., weather permitting, for firefighters to go to the Greece Ridge Center Mall and walk. For most of the firefighters this turned out to be a stroll through the mall and window shopping! The RRFD purchased the building next to their headquarters station in

2000. This building is utilized for additional office space for fire education, training, and the main room dedicated to exercise equipment. Old fitness equipment was purchased from a fitness professional specializing in body building who was closing his business. The annex building, as it is known, was set up with this fitness equipment, and a treadmill was purchased. The fitness professional demonstrated the use of the equipment, however, did not develop individual firefighter fitness programs.

In the year 2005, the RRFD received grant money for exercise equipment from the federal Homeland Security program. This money helped replace the old equipment, and along with RRFD appropriated budget monies, an additional treadmill, step climber (machine used for the CPAT test) and a pre-cor machine was purchased. The exercise room at the annex is now setup with proper fitness equipment to provide firefighters with a comprehensive fitness program. The primary problem remains that personnel are versed in use of the equipment, however, are unfamiliar in how to establish individualized firefighter fitness programs.

This applied research project (ARP) was developed in accordance with the Federal Emergency Management Agency (FEMA) (2003) Executive Development (ED) course at the National Fire Academy (NFA) Unit 7 “Organizational Culture and Change.” The first objective of Unit 7 was to “identify the characteristics of organizational culture” (p. SM 7-1). This project is an attempt to demonstrate the need to develop a fitness program, address a method to reduce the number of firefighter fatalities from heart attacks, and educate personnel of the same. This ARP also applies FEMA’s (2003) third objective, “to reduce the loss of life of fire personnel” (p. II-2).

Within the next year, RRFD will undergo major changes. The RRFD will have an additional firehouse built resulting in additional firefighters added to the force. This fact re-

emphasizes the importance to develop a more structured fitness program that stresses the need for cardiovascular exercise. Creating such a program at the RRFD will help reduce the potential chance of a firefighter dying of a heart attack, as well as, meet the goals of the NFA and the Executive Fire Officer Program (EFOP).

Literature Review

The literature review for this ARP used information gathered from books, internet web sites, magazine articles, pamphlets, and fire department SOP's or SOG's pertaining to cardiovascular fitness programs. First, the information was gathered from the Learning Resource Center (LRC) at the NFA located in Emmitsburg, Maryland in September 2006. Additional research was done at the Town of Greece Public Library in Rochester, New York, the State Fire Academy Library in Montour Falls, New York, and the RRFD library at the headquarters station. In addition, interviews were conducted with individuals who have vast knowledge of the cardiovascular system and physical fitness.

For this research project, information was gathered to show the need to develop a cardiovascular fitness program at RRFD. For this ARP only, the researcher will focus on firefighter deaths that occurred from heart attacks.

Cardiac-related problems are a serious health issue for both fire departments and every community. According to the American Heart Association (AHA) (n.d.), "most cardiac arrests are the results of an abnormal heart rhythm which causes the heart to beat in an irregular and chaotic fashion" (p. 1). The National Institutes of Health (NIH) Resuscitation Outcomes Consortium (ROC) (n.d.) reports, "180,000 treatable out-of-hospital cardiac arrests occur each year in the United States and Canada, and half of these cardiac arrests occur without warning.

Furthermore, the NIH/ROC estimates 40,000 deaths could be prevented yearly if out-of-hospital cardiac arrest survival rates were raised from 5 to 20 %” (p.1).

Webster's New World Dictionary (1975) defines the human heart as: the central, vital or main part; essence; core of the human body (p.345). Firefighters are at a greater risk of cardiovascular disease due to intense physical and psychological stress after periods of inactivity. According to the Federal Emergency Management Agency (FEMA) (2002) study, firefighters are more likely to suffer a heart attack in the course of performing suppression duties on the fire ground, while in the fire station, or during training exercises (p. 25). In addition, FEMA (2002) explains each year in the United States and its protectorates, approximately 100 firefighters are killed while on-duty. The article goes on to say the leading nature of fatal injuries to firefighters is heart attacks at 44% (p. 1).

In an article written by Dittmar (2006) wrote:

One finding stands out when analyzing research related to the factors that have been contributing to firefighter cardiovascular-related line-of-duty deaths (LODD's) over the past decade: Members of the fire service may have more control over their health and these LODD statistics than they realize. These events need not necessarily be accepted as inevitable. With the proper interventions, the number of such deaths and illnesses can be decreased. (p.49)

Further in the article Dittmar continued, “it is important for firefighters to recognize their health can be in jeopardy not only when they are fighting fires but also during the considerable downtime between fires, depending on their lifestyle choices” (p. 49).

According to Stagnaro (2006):

Firefighting has long been recognized as a challenging and physically demanding job. Stagnaro goes on to say, “although there has been tangible progress in combating the national fire problem, there has been only limited progress in preventing the loss of firefighters.” One of Stagnaro’s recommendations is to, develop and implement national medical and physical fitness standards that are equally applicable to all firefighters, based on the duties they are expected to perform. (p. 103)

Levitsky (2006) states, “there’s clear data, any time one starts exercising, at any age, there is a decrease risk of cardio decease” (p. 6A).

The job of a firefighter occasionally allows for times of inactivity. Some of the best cooks today are firefighters! With the opportunity to cook and time for relaxation, the ingredients are present for weight gain. The American Heart Association (AHA) (2003) explains, even with the absence of all other heart health risk factors, overweight people are far more likely to develop heart disease than those who are not overweight (p.1). Franklin and Shepard (2000) stated:

Exercise probably acts in part indirectly by reducing cardiac risk factors such as hypertension, obesity, an adverse lipid profile, and the urge to smoke cigarettes.

In addition, enhancement of cardiac function decreases the rate-pressure product (and thus the cardiac demands) at any given intensity of exercise. (p. 8)

According to the U.S. Fire Administration (n.d.), there are an estimated 1,096,900 (career: 296,850, volunteer: 800,050) firefighters today (p. 1). Heart attacks do not distinguish by gender amongst firefighters. Sexstone (2006) stated, “firefighting is a dangerous job and requires everyone to be in the best physical shape, no matter what the gender or color. The men and women of this job need to be in the best physical condition” (p. 13A). A study by Rosentock

(1991) found the risk of heart disease increased with duration of employment of the Seattle firefighters (p. 2). Roselle (2006) interviewed Tom Ambrose who said, “It’s the aging process you’re fighting constantly. Everybody on the fire scene should maintain some level of fitness” (p. 2).

Ellis (2006) states:

We work in an industry which requires us to be physically fit, not just strong.

Whether you run, walk, or bike, the key is to find an activity you’ll actually enjoy.

The benefits are endless, but the bottom line is this: when you improve your aerobic fitness, you increase your efficiency on the fire ground, as well as, your general health. So get out and get moving! (p. 88)

Fahy (2006) writes, “as we report each year, the largest share of on-duty firefighter fatalities are the results of sudden cardiac death—usually heart attacks” (p. 56).

National Fire Protection Association (NFPA) (2003) 1582 provides procedures for fire departments to follow while dealing with medical problems that may plague a firefighter during their career (p. 1582-1). NFPA (2000) 1582 states:

The technical committee believes health-related fitness programs will contribute significantly to reducing firefighter fatalities and injuries. Overweight, out-of-shape firefighters are an accident waiting to happen. The multiple stress factors and rigor of the profession requires firefighters to be medically and physically fit in order to perform the required tasks. The committee considers this standard to a companion document to NFPA 1582, and, if used by fire departments, it will reduce firefighter fatalities and injuries. Furthermore, the committee considers this standard to be a tool used in conjunction with the Joint Labor-Management

Wellness Initiative, developed by the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC). (p. 1583-1)

The International Association of Fire Chiefs (IAFC) and the International Association of Firefighters (IAFF) have joined together to develop programs to help prevent health problems among firefighters. These programs can be found in the Fire Service Joint Labor Management Wellness-Fitness Initiative.

The cost an organization experiences for lost time of personnel and related expenses continues to grow at an alarming rate. DiNubile and Sherman (1999) support this by saying: Increased health costs have been the focus of intense concern in the United States for at least a decade, and for good reason, considering yearly national expenditures exceed \$1 trillion. Employers shoulder much of these costs and thus have an obvious stake in containing them.”

Prevention of injury and disease has thus far been neglected in healthcare reform efforts, and only a small percentage of national healthcare spending has been dedicated to preventive measures. (p. 1)

Fire departments are a form of a healthcare facility as the department provides a service of helping people. Fire departments are in the business of reducing life loss as stated in the mission statement of the U.S. Fire Administration (2004 p.1).

According to Medical News Today (2004):

Not only does disease and early death cause suffering to the victim and their friends and family, but there are high economic costs in terms of sickness, absence from work and health care. Most of the estimates have been conducted in

the USA, where the population attributable risk caused by inactivity as been put at 18% for heart disease at a cost of \$24 billion (1995 \$ value). (p. 2)

The job of being a firefighter is very unpredictable. You can go from a state of total relaxation as in sleeping, to fighting a multiple alarm fire within a matter of minutes. The rapid increase of the heart rate in a short period of time is not good for the heart. The heart rate for firefighters that are not physically fit will increase much faster than firefighters who are more so. The physically fit firefighter will be able to perform better in doing their job and is at less risk to have a cardiac-related problem. McArdle and Katch (2000) state, “heart rate for the untrained person accelerates relatively rapidly with increasing exercise demands; a much smaller heart rate increase for the trained person” (p. 354). According to Medical News Today (2005), “there is strong and consistent evidence from observational studies that physical inactivity and poor cardiovascular fitness (i.e., fitness) are associated with higher illness and death from all causes, including cardiovascular disease” (p. 1).

McCoy (2006) suggests, “exercise regularly: it can increase circulation, improve coordination and help prevent conditions that increase the risk of dementia such as heart disease and diabetes” (p.3C). Mitchell and Bolger (2006), states, “if people can understand the decisions they make today...to opt not to exercise...have tremendous ramifications. And they may not get a second chance to make the right decision” (p. 8).

In summary, all the literature reviewed supports the need for the RRFD to develop a cardiovascular fitness program. The literature provided in-depth details that heart attacks should be a major concern to all fire departments and its members. The wide range of material was instrumental for this researcher to gain knowledge of where to turn for vital information and statistics to support why the RRFD should have such a program. Unfortunately, what was not

found in the literature was a way that would cause firefighters to willingly and voluntarily change their physical fitness habits and become more physically fit. The evidence is clear from the literature; steps can and should be taken to address the problem of firefighters dying from heart attacks while on duty. Having a cardiovascular program in place at RRFD would clearly demonstrate they are not only looking out for the best interest of their firefighters, but the health of the entire organization.

Procedures

This research project used descriptive research to help identify the need to develop a cardiovascular fitness program at the RRFD. The research used is a review of published literature, information retrieved from various internet sources, personal interviews, and external surveys.

The literature review for this ARP began in September 2006 at the LRC at the NFA in Emmittsburg, Maryland. A search of articles and information pertaining to firefighters having heart attacks were found using the LRC computerized card catalog. Additional literature was reviewed at the Town of Greece Public Library, Rochester, New York, the New York State Fire Academy Library in Montour Falls, and the RRFD headquarters station library. The literature focused on gathering enough information to help justify the need to develop such a program.

One of the objectives of this research project was to gather information from other fire departments and public safety organizations in regards to cardiovascular physical fitness. A cover letter (Appendix A) and a survey was sent to fire departments (Appendix B) and public safety organizations (Appendix C) of various sizes. The surveys consisted of questions pertaining to the presence of fitness program in place, who participated in the program, their work schedule, the presence of a certified fitness instructor, and what equipment was necessary

to have such a program. The fire department surveys were sent via the internet, U.S. mail with a self-addressed stamped envelope, or hand delivered to 35 different fire departments. The fire departments were chosen from fellow classmates at the NFA from around the United States and from local fire departments, including the researcher's fire department. The survey was sent out with instruction to return the surveys within one week of receiving the surveys. All 35 (100%) of the surveys were completed and returned within the specified time. A total of 20 surveys were distributed to public safety organizations. The surveys were distributed in the same manner as the fire department surveys with the understanding the surveys would need to be returned at the end of this one-week period. At the end of this one-week period, all 20 (100%) surveys were received with 100% completion within the specified period of time. All surveys were completed during the months of November and December 2006. The goal of the surveys was to help answer the ARP questions:

1. Why should the Ridge Road Fire District institute a cardiovascular fitness program?
2. What medical data supports designing a cardiovascular program?
3. How do other public safety professions address cardiovascular fitness?
4. What resources would the Ridge Road Fire District need to develop a cardiovascular fitness program?

An interview with Doctor Jerry L. Miller was conducted in his office lasting one hour on November 2, 2006 (Appendix D). Dr. Miller has been a cardiologist for 22 years and now operates his own private practice. The goal of the interview was to gain information that would assist in the justification process needed to develop a cardiovascular fitness program at RRFD.

An additional interview was conducted with Doctor Jagdish Mishra. This interview took place in this researcher's office on November 20, 2006 lasting 1.5 hours (Appendix D).

Dr. Mishra has been a cardiologist for 6 years in his own private practice. The goal of this interview was to gain information from the doctor to help justify the need to develop a cardiovascular program and what equipment would be necessary to help develop this program.

The goal of the surveys, interviews, and data collection portions of this study was to gain information to support the need of implementing a cardiovascular fitness program and to identify specific components for such a program. The limitations of the research and data was limited to the information in the literature review section of this ARP and by the six-month time limit for the completion and submission of this ARP as required by the EFOP at the NFA. In addition, this research could not specifically inspect medical records making it difficult to assess individual medical cases. This constraint was due to the Health Insurance Portability and Accountability Act (HIPPA) regulations.

The guidelines within this ARP are those established by the American Psychological Association (2001) Fifth Edition. This researcher assumed the literature reviewed for this ARP to be factual, objective, and unbiased. Participants in the surveys and interviews were honest and followed their immediate organization's protocol. Upon completion of the literature review and data collection from the surveys and two interviews, this researcher shall take information gathered and present to the Board of Fire Commissioners of the RRFD the overwhelming need to develop a comprehensive cardiovascular fitness program.

Definition of Terms

<i>ARP</i>	Applied Research Project
<i>Cardiovascular</i>	Pertaining to the heart and blood vessels as a system
<i>CVD</i>	Cardiovascular disease
<i>EFOP</i>	Executive Fire Officer Program

<i>FEMA</i>	Federal Emergency Management Association
<i>Heart</i>	Pertaining to the central, vital, or main portion
<i>HIPPA</i>	Health Insurance and Portability and Accountability Act
<i>Need</i>	Necessity or obligation
<i>NFA</i>	National Fire Academy
<i>Program</i>	A documented plan or procedure
<i>RRFD</i>	Ridge Road Fire District
<i>USFA</i>	United States Fire Administration

Results

This ARP began as a result of more than 30 year's experience from this researcher as a firefighter and officer. Additionally, this research revealed overwhelming data that supported conclusively heart attacks as the leading cause of death among firefighters, irrespective of gender.

The results of this project were used to determine the need to develop a cardiovascular physical fitness program at the RRFD. Evidence was obtained from literature reviewed and information from both surveys and interviews. The information gathered helped answer the following four research questions for this ARP.

Research question one: "Why should the Ridge Road Fire District institute a cardiovascular fitness program?" A survey was sent to 35 different fire departments of varying size within the United States in hopes of gathering information to answer this question. A total of 35 surveys (100%) were collected. The first question asked, "What do you think is the leading cause of firefighter death?" Table 1 presents the data from the questionnaire.

Table 1

What do you think is the leading cause of firefighter fatalities?

Choices	Questionnaire	Results
A. Being trapped in a building fighting a fire	(5)	14.3%
B. Traffic Accidents	(3)	8.6%
C. Heart Attacks	(24)	68.6%
D. Struck by a vehicle while in the street	(1)	2.8%
E. Building collapse	(2)	5.6%

The second question asked was “Does the fire department you work for have a cardiovascular fitness program?” Table 2 presents the data from the questionnaire.

Table 2

Does the fire department you work for have a cardiovascular fitness program?

Cardiovascular Fitness Program	Questionnaire	Results
Yes	(4)	11.4%
No	(31)	88.6%

The third question, “What is the firefighter’s work schedule?” Table 3 presents the data from the questionnaire.

Table 3What is the firefighter's work schedule?

Work Schedule	Questionnaire	Results
A. 8-hour shift	(1)	2.8%
B. 10-hour day/14-hour night	(22)	62.8%
C. 12-hour day/12-hour night	(3)	8.6%
D. 24-hour shift	(9)	25.8%
E. Other	(0)	

The fourth question asked, "Are firefighters required to workout during their shift?" Table 4 presents the data from the questionnaire.

Table 4Are firefighters required to work out during their shift?

Workout During Their Shift	Questionnaire	Results
Yes	(7)	20%
No	(28)	80%

The fifth question asked, "What type of cardiovascular fitness equipment does the fire department provide?" Table 5 presents the data from the questionnaire.

Table 5

What type of cardiovascular fitness equipment does the fire department provide?

Cardiovascular Fitness Equipment	Questionnaire	Results
A. Treadmill	(21)	60%
B. Step mill	(6)	17.1%
C. Bicycle	(24)	68.6%
D. Other—Specify: Rowing	(3)	8.6%
Skiing	(2)	5.7%
None	(8)	22.9%

The sixth question asked, “Who participates in physical fitness at the fire department you work for?” Table 6 presents the data from the questionnaire.

Table 6

Who participates in physical fitness at the fire department you work for? (Circle all that apply)

Participants	Questionnaire	Results
A. Firefighters	(29)	83%
B. Company Officers	(22)	63%
C. Chief Officers	(7)	20%
D. All Personnel	(9)	25.7%

The seventh question asked, “Who trains the firefighters in physical fitness?” Table 7 presents the data from the questionnaire.

Table 7Who trains the firefighters in physical fitness?

Who Trains the Firefighters?	Questionnaire	Results
A. They do it themselves	(28)	80%
B. Have a regularly scheduled instructor	(7)	20%

The eighth question asked, “Does the fire department you work for have a certified fitness instructor?” Table 8 presents the data from the questionnaire.

Table 8Does the fire department you work for have a certified fitness instructor?

Certified Fitness Instructor	Questionnaire	Results
Yes	(4)	11.4%
No	(31)	88.6%

The second research question, “What medical data supports designing a cardiovascular program?” To answer this question, this researcher utilized the information gathered in the literature review section from the following:

1. The American Heart Association (n.d.) explains most cardiac arrest is the direct result of abnormal heart rhythms which cause the heart to beat in an irregular and chaotic fashion (p. 1).
2. The American Heart Association (2003) states even with the absence of all other heart health risk factors, overweight people are far more likely to develop heart disease than those who are not overweight (p. 1).

3. The National Institute of Health Resuscitation Outcome Consortium (n.d.) reports 180,000 treatable out-of-hospital arrests occur each year in the United States and Canada, with half of these cardiac arrests occurring without warning. In addition, they estimate 40,000 deaths could be prevented yearly if out-of-hospital cardiac arrest survival rates were raised from 5 to 20% (p. 1).
4. In a report by Franklin and Shepard (2000) they state, “exercise probably acts in part indirectly by reducing cardiac risk factors such as hypertension, obesity, an adverse lipid profile and the urge to smoke cigarettes.” In addition they say, “enhancement of cardiac function decreases the rate-pressure product (and thus the cardiac demands) at any given intensity of exercise” (p. 8).
5. Fahy (2006) brings to light each year the largest share of on-duty firefighter fatalities are the result of sudden cardiac death, usually heart attacks (p. 56).
6. The National Fire Protection Association states, “overweight, out-of-shape firefighters are an accident waiting to happen” (p. 1583-1).
7. McCardle and Katch (2000) explain the heart rate for the untrained person accelerates relatively rapidly with increasing exercise demands; a much smaller heart rate increase for the trained person (p. 354).
8. McCoy (2006) suggests regular exercise as it can increase circulation, improve coordination, and help prevent conditions increase the risk of dementia such as heart disease and diabetes (p. 3C).
9. Mitchell and Bolger (2006) states, “if people can understand the decision they make today and opt not to exercise, it will have tremendous ramifications. And they may never get a second chance to make the right decision (p. 8).

10. Levitsky (2006) states, “There’s clear data, any time one starts exercising, at any age, there is a decrease in the risk of cardio disease” (p. 6A).

In addition, this researcher interviewed two separate cardiologists to gather information on the importance of having a cardiovascular fitness program (Appendix D). During the interviews both doctor’s were asked, “What happens to the heart from lack of exercise?” Both doctors answered the body becomes de-conditioned from lack of exercise. Dr. Mishra went on to say, the heart is a muscle and like any other muscle in the body, it needs a good amount of exercise for an adequate level of oxygen and other nutrients supplied to it. The doctors were then asked, “What strain is put on the heart when going from relaxation to a strenuous activity?” Dr. Miller answered, “increased heart rate/increased blood perfusion leading to increased myocardium consumption.” Dr. Mishra says, “without building a regular exercise program for the heart, it can be injurious and harmful to the heart.”

The third research question, “Do other public safety professions address cardiovascular fitness?” A questionnaire was distributed to 20 different non-fire service organizations of various sizes within the United State in hopes of gathering information to answer this research question. These questionnaires were sent to police departments, ambulance service, 911 communication centers, and emergency department personnel. A total of 20 surveys (100%) were collected. The first question on the questionnaire asked, “What type of public safety profession do you work for?” The second question asked, “Does the profession you work for have a cardiovascular fitness program?” Table 9 presents the data gathered from the questionnaire.

Table 9

Does the organization you work for have a cardiovascular fitness program?

Cardiovascular Fitness Program	Questionnaire	Results
Yes	(2)	10%
No	(18)	90%

The third question asked, “What is your work schedule?” Table 10 presents the data gathered from the questionnaire.

Table 10

What is your work schedule?

Work Schedule	Questionnaire	Results
A. 8-hour shift	(12)	60%
B. 10-hour day/14-hour night	(0)	
C. 12-hour day/12-hour night	(8)	40%
D. 24-hour shift	(0)	
E. Other	(0)	

The fourth question asked, “Are you required to workout during your shift?” Table 11 presents the data from the questionnaire.

Table 11Are you required to workout during your shift?

Workout During Your Shift?	Questionnaire	Results
A. Yes	(2)	10%
B. No	(18)	90%

The fifth question asked, “What type of cardiovascular equipment does the profession you work for provide?” Table 12 presents the data from the questionnaire.

Table 12What type of cardiovascular equipment does the organization you work for provide?

Equipment Provided	Questionnaire	Results
A. Treadmill	(8)	40%
B. Step mill	(1)	5%
C. Bicycle	(4)	20%
D. Other--Specify: Elliptical	(1)	5%
Nothing	(14)	70%

The sixth question asked, “Who participates in physical fitness at the organization you work for?” Table 13 presents the data from the questionnaire.

Table 13How participates in physical fitness at the profession you work for?

Participants	Questionnaire	Results
A. Workers	(7)	35%
B. Supervisors	(4)	20%
C. All Personnel	(3)	15%

The seventh question asked, “Who trains the personnel in physical fitness?” Table 14 presents the data from the questionnaire.

Table 14Who trains the personnel in physical fitness?

Who Trains the Personnel?	Questionnaire	Results
A. They do it themselves	(18)	90%
B. Has a regularly scheduled instructor	(2)	10%

The eighth question asked, “Does the organization you work for have a certified fitness instructor?” Table 15 presents the data from the questionnaire.

Table 15Does the organization you work for have a certified fitness instructor?

Certified Fitness Instructor	Questionnaire	Results
Yes	(1)	5%
No	(19)	95%

The ninth question asked, “Does the organization you work for have an on-site exercise facility?” Table 16 presents the data from the questionnaire.

Table 16

On-Site Facility	Questionnaire	Results
Yes	(14)	70%
No	(6)	30%

The fourth research question, “What resources would the RRFD need to develop a cardiovascular fitness program?” Questionnaires were distributed to fire departments and public safety professions. In addition, interviews with Dr. Jagdish Mishra and Dr. Jerry Miller were used to answer this question. The questionnaire to fire departments and public safety professional organizations asked what type of cardiovascular fitness equipment their place of employment provided. During the physician interviews, they were asked what type of equipment would be needed to help reduce the strain on the heart. Answers to these questions revealed the following results:

- Treadmill
- Step mill
- Rowing machine
- Elliptical
- Weight lifting equipment
- Place to walk
- Place to jog
- Area to ride a bike

- Skiing

The questionnaires revealed fire departments are more apt to provide their employees with physical fitness equipment than other public safety professions. Unfortunately, even with the equipment provided, firefighters are still dying at an alarming rate from heart attacks. Firefighters are at their work place for longer duration of time than most public servants. Although firefighters are afforded the opportunity to participate in physical fitness activities during their shift, they must be motivated to do so.

Discussion

The purpose of this ARP was to gain information to show the need in developing a cardiovascular fitness program at the RRFD. The results of the questionnaires for this ARP reflected fire departments do take an active role in providing firefighters physical fitness equipment. However, firefighters are either not willing to participate or just not motivated to do so. On-duty firefighter deaths do not just happen to members of a large department; they occur to any member in any size department.

The RRFD experienced a line-of-duty death from a heart attack to firefighter in 1998. Since that time, RRFD has done little to address the situation of heart attack deaths among firefighters. The RRFD does allow time during shifts for firefighters to workout. Unfortunately, there have been no formal programs or guidance established for firefighters. Exercise has been left up to the individuals to do as they please during the allotted time to workout. This researcher distributed a questionnaire (Appendix E) to 25 firefighters at the RRFD to see what their response would be to the question, “What is the leading cause of firefighter fatalities?” After collecting the 25 questionnaires the results were 23 of the 25 or 92% indicated heart attacks.

Even with the knowledge of heart attacks as the primary cause of firefighter fatalities, it has failed to motivate these firefighters to do more to help themselves.

According to the USFA (n.d.), “Fire Service Joint Labor Management Wellness-Fitness Initiative was developed by the IAFC and the IAFF to enhance firefighter wellness, health and safety” (p. 1). Further on in the article it states:

These efforts will contribute to the reduction of the of the leading cause of firefighter fatalities—stress related cardiac deaths, which historically has accounted for 50 percent of firefighter fatalities. Reduction of this type of death alone would positively impact USFA’s goal to reduce fatalities of firefighters by 50 percent within 10 years. (p.2)

With this being said, it behooves the fire service to assess the factors associated with this finding. This researcher gained little information from public safety professional organizations, with the exception of 2 police departments. Size did not matter for these organizations in regards to cardiovascular fitness programs. Some of the professional organizations provided minimal equipment to their employees, but did not allot any time for physical fitness during their work day. Two police departments scheduled an additional hour, Monday-Friday before or after each shift to workout with an onsite physical fitness instructor who works for the department.

In the interview with Dr. Mishra, he elaborated more than just the need for firefighters to workout to be physically fit, he went on to say, “in addition to working out, firefighters need to drink plenty of water and fluids every day, eat multiple servings of fruits and vegetables, appropriate caloric intake, and eat less red meat.

Medical expenses are rising dramatically each year for organizations and individuals. At the RRFD, medical coverage has risen 68% in the last 5 years. This increase does not pertain to

lost time or out-of-pocket expenses for all, just for medical premiums. Having an established physical fitness program has many values for a fire department. It not only helps reduce medical costs for the department and individual, time lost from work for the firefighter, but as Anderson, Hall, and Martin (2004) add, “participants in physical activity is known to yield positive effects on an individual’s physical, mental, and social health” (p. 632). Dittmar (2006) reinforces this by supporting the need to do something to reduce the number of cardiac related deaths of firefighters by saying, “every fire department (paid and volunteer), fire chief, and firefighter must take the initiative in reducing the number of on-duty heart attack deaths” (p. 49).

The findings of this ARP conclusively indicate the RRFD should develop a cardiovascular fitness program. The IAFC and IAFF have teamed up to help provide information to support such a program. Now organizations such as fire departments must establish programs and get firefighters motivated to participate in such a great programs. This will be a cultural change, but it can work.

Recommendation

Based on the foregoing review of literature, data analysis, interview, and discussions, several recommendations and further research can be presented. First and foremost, this researcher recommends the RRFD develop a cardiovascular fitness program. Second, now that the IAFC and the IAFF’s have teamed up and developed The Fire Service Joint Labor Management Wellness-Fitness Initiative program, the RRFD must change the culture and mindset of the firefighters to have them want to participate in a cardiovascular fitness program. Third, part of the firefighter’s annual physical should incorporate a baseline performance in a cardiovascular program for each individual. Fourth, funding must be maintained to ensure the personnel of the RRFD are provided with proper cardiovascular equipment and the equipment is

properly maintained. Fifth, set up a reward system for participants who reach established goals annually.

Additional research should be conducted to ensure the program is meeting the goals of the organization and of the individual firefighters. The research could investigate the following points:

- Is the exercise equipment correct for a cardiovascular fitness program?
- Is there additional equipment that would further enhance existing programs?
- Should an in-house fitness instructor be established training a current firefighter for this role?
- Should the services of a nutritionist be engaged to discuss a proper dietary need?
- Should this program be extended to family and friends?

Crawford (2006) states, “because of the inherent dangers associated with the occupation and the fact firefighters will always be willing to take a certain amount of risk to save a life, we may never be able to completely eliminate line-of-duty-deaths” (p. 40). In conclusion, as long as the RRFD proactively addresses the problem to reduce the number of firefighter fatalities from cardiac-related problems by providing a cardiovascular fitness program, correct equipment, and the dedicated time to accomplish this, they have shown their support in addressing the staggering facts head-on to protect their personnel. The rest...is up to the individual.

References

- American Heart Association. (2003). *Risk Factors I Can Change*. Retrieved January 3, 2007, from <http://www.americanheart.org/presenter.jhtml?identifier=4970> (p. 1).
- American Heart Association. (n.d.). *Links in the Chain of Survival*. Retrieved January 5, 2007, from <http://www.americanheart.org/presenter.jhtml?identifier=3012016> (p. 1).
- American Psychological Association (2001). *American Psychological Association Publication Manual* (5th ed., Rev.). Washington, DC: American Psychological Association.
- Anderson, M., Hall, S., & Martin, M. (2004). Sudden Cardiac Death. Darcy (Ed.), *Foundation of Athletic Training* (3rd ed., p. 632). Philadelphia, Pa.: Lippincot Williams & Wilkins.
- Center for Disease Control. (2006). Heart Disease and Stroke: The Nation's Leading Killer. Retrieved October 28, 2006.
- Crawford, B. (2006). Separate but Equal. *Fire Chief Magazine*, July, (p. 40).
- DiNubile, N., & Sherman, C. (1999, February 2). *Exercise and the Bottom Line*. Retrieved January 2, 2007, from http://www.physsportsmed.com/issues/1999/02_99/dinubile.htm.
- Dittmar, M. (2006). Firefighters and Heart Disease: Beyond the Statistics. *Fire Engineering*, 49.
- Ellis, J. & M. (2006). Get Moving, Part 1. *Fire Rescue Magazine, December*, (p. 88).
- Fahy, R. (2006). United States Firefighting Deaths Related to Training 1996-2005. *NFPA Firefighter Fatalities 2005*, (July/August), (p. 56).
- Federal Emergency Management Agency (2002). Executive Summary. In (Ed.), *Firefighter Fatality Retrospective Study 1990 - 2000* (p. 1).
- Federal Emergency Management Agency (FEMA) (2002). Percent of Heart Attack Deaths by Year (1984-2000). In (Ed.), *Firefighter Fatality Retrospective Study 1990-2000* (p. 25).
- FEMA U.S. Fire Administration (2003). In (Ed.), *Executive Fire Officer Program Operational Policies and Procedures* (Rev. Ed.). Emmitsburg, Maryland.

- FEMA U.S. Fire Administration (2003). Organizational Culture and Change. In (Ed.), *Executive Development* (pp. SM 7-1). Emmitsburg, Maryland.
- Fielding. (n.d.). Retrieved November 4, 2005, from <http://www.comebackalive.com/df/dngrjobs.htm>. Dangerous Jobs.
- Franklin, B., & Shepard, R. (2000, September). *Avoiding Repeat Cardiac Events*. Retrieved January 2, 2007, from http://www.physsportsmed.com/issues/2000/09_00/franklin.htm (p. 8).
- Levitsky, D. (2006). Fitness, Active Everywhere. *Democrat and Chronicle*, 6A.
- McArdle, W., & Katch, F. & V. (2000). Exercise Heart Rate: Graded Exercise. In E. Lupash & R. Keifer & C. Murphy & S. Bertling (Eds.), *Essentials of Exercise Physiology* (3rd ed., p. 354). Philadelphia, PA: Lippincott Williams & Wilkins.
- McCoy, K. (2006). This Year, Keep Your Mind in Shape, Too. *Democrat and Chronicle*, 3C.
- Medical News Today. (2004, July 7). *Physical Activity and Health. A Closer Look at the Other Side of Energy Balance*. Retrieved November 7, 2006, from <http://www.medicalnewstoday.com/printerfriendlynews.php?newsid=10426>.
- Medical News Today. (2005, December 31). *Poor Fitness Associated With Increase in Prevalence Of Cardiovascular Disease*. Retrieved November 7, 2006, from <http://www.medicalnewstoday.com/printerfriendlynews.php?newsid=35550>.
- Mitchell, T., & Bolger, A. (2006). A Heart Disease Checkup. *USA Weekend*, (p. 8).
- National Fire Protection Association. *Comprehensive Occupational Medical Program for Fire Department* (2003 ed.), (p. 1582-1). Quincy, MA.
- National Fire Protection Association (2000). Standard on Health-Related Fitness Programs for Firefighters. (p. 1583-1). Quincy, MA.
- National Institutes of Health. (n.d.). *Resuscitation Outcomes Consortium*. Retrieved January 5, 2007, from www.uwctc.org (p. 1).

- Roselle, J. (n.d.). *Overexertion Leading Cause of Death Failing Fitness can be Fatal to Firefighters*. Retrieved October 1, 2006, from www.theithacajournal.com-Ithaca, NY.
- Rosentock, Linda (1991). *Northwest Firefighters Mortality Study: 1945-1989*, (p. 2).
- Sexstone, D. (2006). Keeping all firefighters save. *Democrat and Chronicle* (p. 13A).
- Stagnaro, V. (2006). Firefighter Fatalities: The Preventable Losses. *Fire Engineering*, (p. 103).
- U.S. Fire Administration (2004). *Firefighters* (p. 1). Retrieved 10/28/06, from <http://www.usfa.dhs.gov/statistics/firefighters/>.
- U.S. Fire Administration (2004). U.S. Fire Administration Mission Statement. In (Ed.), *Firefighter Fatalities in the United States in 2004* (p. 1).
- U.S. Fire Administration (USFA). (n.d.). *Firefighter Fitness-Wellness*. Retrieved October 19, 2006, from <http://www.usfa.dhs.gov/research/safety/fitness.shtm>.
- U.S. Fire Administration. (n.d.). *Firefighters*. Retrieved November 16, 2006, from <http://www.usfa.gov/statistics/firefighters/>.
- United States Fire Administration (2002). *Firefighter Fatality Retrospective Study 1990 - 2000*, (p. 25).
- United States Fire Administration (2002). In (Ed.), *Firefighter Fatality Retrospective Study 1990 - 2000* (p. 1).
- United States Fire Administration (2002). Executive Summary. *Firefighter Fatality Retrospective Study 1990 – 2000* (p. 1).
- Webster's New World Dictionary (1975). *Webster's New World Dictionary with Student Handbook* (Rev. ed.): World Publishing Company.

Appendix A

RIDGE ROAD FIRE DISTRICT

1299 Long Pond Road

Rochester, New York 14626

From the Office of Deputy Chief Rickman

I am enrolled in the Executive Fire Officer Program through the National Fire Academy in Emmitsburg, Maryland. I have just completed my fourth and final 2 week class in this program. One of the requirements of this program is to do an applied research project. The project I have chosen is: The need to develop a cardiovascular fitness program at the Ridge Road Fire District.

I would appreciate it if you would take the time to answer the questions on the following page(s) and return it to me within one-week of receiving this survey in the enclosed self-addressed envelope. Your input will assist me gather the appropriate data to justify developing a cardiovascular fitness program at the Ridge Road Fire District.

Thank you in advance for your time and cooperation with completing this questionnaire.

Sincerely,

William H. Rickman

Appendix B

Fire Department Questionnaire

- 1.) What do you think is the leading cause of firefighter fatalities?
 - A. Being trapped in a building fighting a fire
 - B. Traffic Accidents
 - C. Heart Attacks
 - D. Struck by a vehicle while in the street
 - E. Building collapse
- 2.) Does the fire department you work for have a cardiovascular fitness program?
 - A. Yes
 - B. No
- 3.) What is the firefighters work schedule?
 - A. 8-hour shift
 - B. 10-hour day/14-hour night
 - C. 12-hour day/12-hour night
 - D. 24-hour shift
 - E. Other
- 4.) Are the firefighters required to workout during their shift?
 - A. Yes
 - B. No

- 5.) What type of cardiovascular fitness equipment does the fire department provide?
- A. Treadmill
 - B. Step mill
 - C. Bicycle
 - D. Other—Specify
- 6.) Who participates in physical fitness at the fire department you work for? Circle all that apply.
- A. Firefighters
 - B. Company Officers
 - C. Chief Officers
 - D. All Personnel
- 7.) Who trains the firefighters in physical fitness?
- A. They do it themselves
 - B. Have a regularly scheduled instructor
- 8.) Does the fire department you work for have a certified fitness instructors?
- A. Yes
 - B. No

Fire Department Name:

Name of person and rank completing this questionnaire:

Mail completed response within 1 week of receipt of the questionnaire to:

Deputy Chief William H. Rickman
Ridge Road Fire District
1299 Long Pond Road
Rochester, NY 14626
wrickman@rrfd.org 585-453-1202

Appendix C

Public Safety Professional Organization Questionnaire

- 1.) What type of profession do you work for?
- 2.) Does the organization you work for have a cardiovascular fitness program?
 - A. Yes
 - B. No
- 3.) What is your work schedule?
 - A. 8-hour shift
 - B. 10-hour day/14-hour night
 - C. 12-hour day/12-hour night
 - D. 24-hour shift
 - E. Other
- 4.) Are you required to work out during your shift?
 - A. Yes
 - B. No
- 5.) What type of cardiovascular fitness equipment does the organization you work for provide?
 - A. Treadmill
 - B. Step mill
 - C. Bicycle
 - D. Other—Specify
- 6.) Who participates in physical fitness at the organization you work for? Circle all that apply.
 - A. Workers
 - B. Supervisors

C. All Personnel

7.) Who trains the personnel in physical fitness?

A. They do it themselves

B. Has a regularly scheduled instructor

8.) Does the profession you work for have a certified fitness instructors?

A. Yes

B. No

9.) Does the organization have an on-site exercise facility?

A.) Yes

B.) No

Name of person completing this questionnaire:

Mail or e-mail completed questionnaire within 1 week of receiving this questionnaire to:

Deputy Chief William H. Rickman
Ridge Road Fire District
1299 Long Pond Road
Rochester, N.Y. 14626
wrickman@rrfd.org 585-453-1202

Thank you in advance for completing this questionnaire.

Appendix D

Doctor Interview

Name:

Type of Doctor:

How many year's of experience?

1.) Because firefighting is a stressful and strenuous job do you recommend firefighters work out? If yes, how often? If no, why not?

2.) What happens to the heart from lack of exercise?

3.) What strain is put on the heart from going from relaxation to a strenuous activity?

4.) What type of activity would you recommend to help with this type of life style?

5.) What equipment would be needed to help reduce the strain on the heart?

Appendix E

Ridge Road Fire District Firefighter Questionnaire

1.) What do you think is the leading cause of firefighter fatalities?

- A. Being trapped in a building fighting a fire
- B. Traffic Accidents
- C. Heart Attacks
- D. Struck by a vehicle while in the street
- E. Building collapse